

Questions/Discussion Topics

Alignment

- How accurately can the magnetic centres be aligned on the girders? How is this to be achieved? (we assume 25 microns for the multipoles, 50 microns for the dipoles and roll errors of 100 urad)
- How accurately can the girders be placed in-situ? (we assume 150 microns)
- How often will we need to move the girders, for what reason, and how long will this take? (initial installation, alignment for beamlines, reduction of corrector strengths)
- What (if any) are the benefits for being able to align the girders remotely, with beam? (time? Accuracy?)
- What kind of monitoring is necessary to track the girder positions over time? (HLS, local encoders, survey, ...)
- What will be the initial alignment / calibration errors for the BPMs? Relative to what? (we assume 500 microns absolute)
- What kind of beam-based alignment methods are available to cope with initial alignment errors? (BBA to quads, skew quads, sextupoles, with-beam girder alignment, how to BBA reverse-bends)

Vibrations

- Is it better to have single long girder where all magnet motion is correlated but has a lower fundamental frequency, or several shorter girders with less correlation but higher frequency?
- What is the overall amplification factor ground => girder => magnet => beam?
- What damping measures can be put in place (passive / active)
- How do we specify a stability target?
 - By frequency? Total? RMS? Peak?
 - Cumulate RMS displacement suffers from 1/f noise if integrated forwards, what's your approach?
- Transfer function between magnets?
- Phase shift in floor and girder measurements?
- Transfer function across magnets of two different girders? ("beam jump")
- Water cooling and worst offenders with regards to noise
- Air conditioning / circulation: any evidence of its impacts on stability ?
- Are you able to accurately model cam rollers (in terms of vibration)? If so how is this done?
- Is there a trade off to be had between alignment accuracy and vibration – what's the best way to assess this?